Scope of Amended Claims

["Received at International Office on January 14, 2001 (14. 01. 01): Claims 1 and 6 in the initial application have been amended; no amendments in other claims (2 pages)]

1. (amended) An etching method for etching an SiN_x layer on a Cu layer formed at a workpiece placed inside a processing chamber by raising to plasma a processing gas introduced into said processing chamber to expose said Cu layer, wherein;

said processing gas contains a gas constituted of C, H and F and O_2.

2. An etching method according to claim 1, wherein;
said gas constituted of C, H and F is CH_2F_2.

3. An etching method according to claim 1, wherein;
said gas constituted of C, H and F is CH_3F.

4. An etching method according to claim 1, wherein;
said gas constituted of C, H and F is CHF_3.

5. An etching method according to claim 1, wherein;
an inert gas is added into said processing gas.

6. (amended) A plasma processing method comprising;

a step in which a processing gas containing a gas constituted of C, H and F and O_2 is raised to plasma and an SIN_X layer on a Cu layer is etched using a photoresist layer having a specific pattern formed therein, thereby exposing said Cu layer;

a step implemented after said etching step, in which said photoresist layer is ashed; and

a step implemented after said ashing step, in which H_2 is introduced into said processing chamber and an H_2 plasma process is implemented on said Cu layer that has become exposed by raising the H_2 to plasma.

7. An etching method according to claim 6, wherein;
said gas constituted of C, H and F is CH_2F_2.

8. An etching method according to claim 6, wherein;
said gas constituted of C, H and F is CH_3F.

9. An etching method according to claim 6, wherein;
said gas constituted of C, H and F is CHF_3.

10. An etching method according to claim 6, wherein;
an inert gas is added into said processing gas.

11. An etching method according to claim 6, wherein;
said etching step, said ashing step and said H_2 etching step are implemented inside a single processing chamber.

Argument based upon Treaty Article 19 (1)

While a technology similar to that achieved in the invention is disclosed in Japanese Unexamined Patent Publication No. H 5-16077 (quoted reference), the quoted reference does not describe the feature that characterizes the invention, i.e., the etching process implemented on the SiN_x layer formed on the Cu layer, and it does not disclose in any way whatsoever another feature of the invention that by adding O_2 into the etching gas, the exposed Cu layer is protected to inhibit the process of oxidation, either. In addition, even by combining the technology disclosed in another quoted reference with the technology disclosed in the quoted reference mentioned above, a person skilled in the art cannot achieve the invention with ease. We are convinced that the invention, which adopts the structural features listed above, is patentable over the entire scope of patent claims set forth herein.

Explanation of Reference Numerals

100 plasma processing apparatus
102 processing chamber
104 processing container
106 magnet
108 lower electrode
110 upper electrode
110a gas outlet hole
112, 114, 116 first ~ third switching valves
118, 120, 122 first ~ third flow regulating valves
124, 126, 128 first ~ third gas supply sources
130 high frequency source
132 matcher
134 baffle plate
136 evacuating pipe
200 first SiO_2 layer
204 Cu layer
206 SiN_x layer
208 second SiO_2 layer
210 photoresist layer
W wafer